What is claimed is:

1. A solid electrolytic capacitor comprising:

a valve metal sheet having a porous portion at a first side thereof;

a dielectric layer formed on said porous portion;

a solid electrolyte layer formed on said dielectric layer;

a collector layer formed on said solid electrolyte layer;

a through-hole electrode penetrating said valve metal sheet and being exposed to a direction of a second side of said valve metal sheet, said through-hole electrode being connected to said collector layer and being insulated from said valve metal sheet;

an electrode terminal exposed to said direction of said second side of said valve metal sheet, said electrode terminal being insulated from said through-hole electrode and connected to said valve metal sheet;

an insulating portion penetrating a portion of said valve metal sheet where said dielectric layer, said solid electrolyte layer, and said collector layer are not provided; and

a penetration electrode penetrating said insulating portion.

2. The solid electrolytic capacitor of claim 1, wherein said penetration electrode is one of a plurality of penetration electrodes.

3. The solid electrolytic capacitor of claim 1, wherein said through-hole electrode is one of a plurality of through-hole electrodes.

4. The solid electrolytic capacitor of claim 1, wherein said electrode terminal is one of a plurality of electrode terminals.

5. The solid electrolytic capacitor of claim 4, wherein said through-hole electrode is one of a plurality of through-hole electrodes.

6. The solid electrolytic capacitor of claim 5, wherein said plurality of though-hole electrodes and said plurality of electrode terminals are arranged in parallel to each other and adjacently to each other.

7. The solid electrolytic capacitor of claim 6, wherein said plurality of through-hole electrodes and said plurality of electrode terminals are arranged alternately.

8. The solid electrolytic capacitor of claim 7, wherein said through-hole electrode is positioned in a middle of a certain through-hole electrode of said plurality of through-hole electrodes and a certain electrode terminal of said plurality of electrode terminals, said certain through-hole electrode hole and said certain electrode terminal being adjacent to each other.

9. The solid electrolytic capacitor of claim 7, wherein one of said plurality of through-hole electrodes and said plurality of electrode terminals is replaced by said penetration electrode.

10. The solid electrolytic capacitor of claim 6, wherein one of said plurality of through-hole electrodes and said plurality of electrode terminals is replaced by said penetration electrode.

11. The solid electrolytic capacitor of claim 1, wherein said penetration electrode is provided at an outer circumference area of said

through-hole electrode and said electrode terminal.

12. The solid electrolytic capacitor of claim 1, further comprising a bump formed on at least one of respective exposed surfaces of said through-hole electrode, said electrode terminal, and said penetration electrode.

13. The solid electrolytic capacitor of claim 1, wherein said valve metal sheet comprises one of Al, Ta, and Nb.

14. The solid electrolytic capacitor of claim 1, wherein said insulating portion comprises organic insulating resin.

15. The solid electrolytic capacitor of claim 1, wherein said penetration electrode contains copper.

16. A solid electrolytic capacitor comprising:

a valve metal sheet having a porous portion at a first side thereof;

a dielectric layer formed on said porous portion;

a solid electrolyte layer formed on said dielectric layer;

a collector layer formed on said solid electrolyte layer;

a via electrode connected to a portion of said valve metal sheet where said porous portion and said collector layer are not provided, said via electrode being exposed to a direction of said first side of said valve metal sheet;

an electrode terminal exposed to said direction of said first side of said valve metal sheet, said electrode terminal being insulated from said via electrode and connected to said collector layer;

an insulating portion penetrating a portion of said valve metal sheet where said dielectric layer, said solid electrolyte layer, and said collector layer are not formed; and

a penetration electrode penetrating said insulating portion.

17. The solid electrolytic capacitor of claim 16, wherein said penetration electrode is one of a plurality of penetration electrodes.

18. The solid electrolytic capacitor of claim 16, wherein said via electrode is one of a plurality of via electrodes.

19. The solid electrolytic capacitor of claim 16, wherein said electrode terminal is one of a plurality of electrode terminals.

20. The solid electrolytic capacitor of claim 19, wherein said via electrode is one of a plurality of via electrodes.

21. The solid electrolytic capacitor of claim 20, wherein said plurality of via electrodes and said plurality of electrode terminals are arranged in parallel to each other and adjacently to each other

22. The solid electrolytic capacitor of claim 21, wherein said plurality of via electrodes and said plurality of electrode terminals are arranged alternately.

23. The solid electrolytic capacitor of claim 22, wherein said penetration electrode is positioned in a middle of a certain via electrode of

said plurality of via electrodes and a certain electrode terminal of said plurality of electrode terminals, and said certain via electrode and said certain electrode terminal are adjacent to each other.

24. The solid electrolytic capacitor of claim 22, wherein one of said plurality of via electrodes and said plurality of electrode terminals is replaced by said penetration electrode.

25. The solid electrolytic capacitor of claim 21, wherein one of said plurality of via electrodes and said plurality of electrode terminals is replaced by said penetration electrode.

26. The solid electrolytic capacitor of claim 16, wherein said penetration electrode is provided at an outer circumference area of said via electrode and said electrode terminal.

27. The solid electrolytic capacitor of claim 16, further comprising a bump formed on at least one of respective exposed surfaces of said via electrode, said electrode terminal, and said penetration electrode.

28. The solid electrolytic capacitor of claim 16, wherein said valve metal sheet comprises one of Al, Ta, and Nb.

29. The solid electrolytic capacitor of claim 16, wherein said insulating portion comprises organic insulating resin.

30. The solid electrolytic capacitor of claim 16, wherein said

penetration electrode contains copper.

31. A solid electrolytic capacitor comprising:

a valve metal sheet having a porous portion on a first side thereof;

a dielectric layer formed on said porous portion;

a solid electrolyte layer formed on said dielectric layer;

a collector layer formed on said solid electrolyte layer;

a through-hole electrode penetrating said valve metal sheet and exposed to a direction of a second side of said valve metal sheet, said through-hole electrode being connected to said collector layer and insulated from said valve metal sheet;

an electrode terminal exposed to a direction of said second side of said valve metal sheet, said electrode terminal being insulated from said through-hole electrode and connected to said valve metal sheet;

a package covering a side surface of said valve metal sheet; and

a penetration electrode penetrating said package in a direction from said first side to said second side of said valve metal sheet.

32. The solid electrolytic capacitor of claim 31, further comprising a bump formed on at least one of respective exposed surfaces of said through-hole electrode, said electrode terminal, and said penetration electrode.

33. The solid electrolytic capacitor of claim 31, wherein said valve metal sheet comprises one of Al, Ta, and Nb.

34. The solid electrolytic capacitor of claim 31, wherein said insulating portion comprises organic insulating resin.

35. The solid electrolytic capacitor of claim 31, wherein said penetration electrode contains copper.

36. A solid electrolytic capacitor comprising:

a valve metal sheet having a porous portion at a first side thereof;

a dielectric layer formed on said porous portion;

a solid electrolyte layer formed on said dielectric layer;

a collector layer formed on said solid electrolyte layer;

a via electrode exposed to a direction of said first side of said valve metal sheet, said via electrode being connected to a portion of said valve metal sheet where said porous portion and said collector layer are not provided;

an electrode terminal exposed to said direction of said first side of said valve metal sheet, said electrode terminal being insulated from said via electrode and connected to said collector layer;

a package covering a side surface of said valve metal sheet; and

a penetration electrode penetrating said package in a direction from said first side to said second side of said valve metal sheet.

37. The solid electrolytic capacitor of claim 36, further comprising a bump formed on at least one of respective exposed surfaces of said via electrode, said electrode terminal, and said penetration electrode.

38. The solid electrolytic capacitor of claim 36, wherein said valve metal sheet comprises one of Al, Ta, and Nb.

39. The solid electrolytic capacitor of claim 36, wherein said insulating portion comprises organic insulating resin.

40. The solid electrolytic capacitor of claim 36, wherein said penetration electrode contains copper.

41. A method of manufacturing a solid electrolytic capacitor, comprising the steps of:

forming first and second penetration holes in a valve metal sheet;

forming a dielectric layer on a first side of the valve metal sheet;

forming a solid electrolyte layer on the dielectric layer;

forming a collector layer on the dielectric layer;

forming a through-hole electrode exposed to a second side of the valve metal sheet in the first penetration hole, the through-hole electrode being connected to the collector layer;

forming an electrode terminal exposed to the second side of the valve metal sheet the electrode terminal being connected to the valve metal sheet;

forming an insulating portion by filing the second penetration hole with insulating material; and

forming a penetration electrode penetrating the insulating portion.

42. The method of claim 41, wherein said step of forming the electrode terminal includes the sub-step of forming the electrode terminal by plating.

43. The method of claim 41, wherein said step of forming the

penetration electrode includes the sub-steps of

forming a third penetration hole in the insulating portion, and

forming the penetration electrode in the third penetration hole by plating.

44. A method of manufacturing a solid electrolytic capacitor, comprising:

forming a blind hole in a first side of a valve metal sheet;

forming a penetration hole in the valve metal sheet;

forming a dielectric layer on the first side of the valve metal sheet;

forming a solid electrolyte layer on the dielectric layer;

forming a collector layer on the dielectric layer;

forming a first insulating portion by filling the blind hole with insulating material;

forming a second insulating portion by filling the penetration hole of the valve metal sheet with insulating material;

forming an electrode terminal exposed in a direction of the first side of the valve metal sheet and connected to the valve metal sheet;

forming a via electrode exposed in the direction of the first side of the valve metal sheet in the first insulating portion and connected to the collector layer; and

forming a penetration electrode penetrating the second insulating portion.

45. The method of claim 44, wherein said step of forming the electrode terminal includes the sub-step of forming the electrode terminal by plating.

46. The method of claim 42, wherein said step of forming the via electrodes includes the sub-steps of

forming a hole in the first insulating portion, the hole reaching a bottom of the blind hole, and

forming the via electrode in the hole of the first insulating portion by plating.

47. The method of claim 44, wherein said step of forming the penetration electrode includes the sub-steps of

forming a penetration hole in the second insulating portion, and

forming the penetration electrode in the penetration hole of the second insulating portion by plating.

48. A method of manufacturing a solid electrolytic capacitor, comprising the steps of:

forming a dielectric layer on a first side of a valve metal sheet;

forming a solid electrolyte layer on the dielectric layer;

forming a collector layer on the dielectric layer;

forming a through-hole electrode exposed to a second side of the valve metal sheet and connected to the collector layer;

forming an electrode terminal exposed to the second side of the valve metal sheet and connected to the valve metal sheet;

forming a package covering a side surface of the valve metal sheet; and

forming a penetration electrode penetrating the package.

49. The method of claim 48, wherein said step of forming the

penetration electrode includes the sub-steps of

forming a penetration hole in the package, and

forming the penetration electrode in the penetration hole of the package by plating.

50. A method of manufacturing a solid electrolytic capacitor, comprising:

forming a blind hole in a first side of a valve metal sheet;

forming a dielectric layer on the first side of the valve metal sheet;

forming a solid electrolyte layer on the dielectric layer;

forming a collector layer on the solid electrolyte layer;

forming an insulating portion by filling the blind hole with insulating material;

forming an electrode terminal exposed in the direction of the first side of the valve metal sheet and connected to the valve metal sheet;

forming a via electrode in the insulating portion, the via electrode being exposed in a direction of the first side of the valve metal sheet and connected to the collector layer;

forming a package for covering a side surface of the valve metal sheet; and

forming a penetration electrode penetrating the package.

51. The method of claim 50, wherein said step of forming the penetration electrode includes the sub-steps of

forming penetration holes in the package, and

forming the penetration electrode in the penetration hole of the package by plating.